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NATIONAL DAM INSPECTION PROGRAM. BRONSON POND DAM (NDI ID NUMBE--ETC(U)
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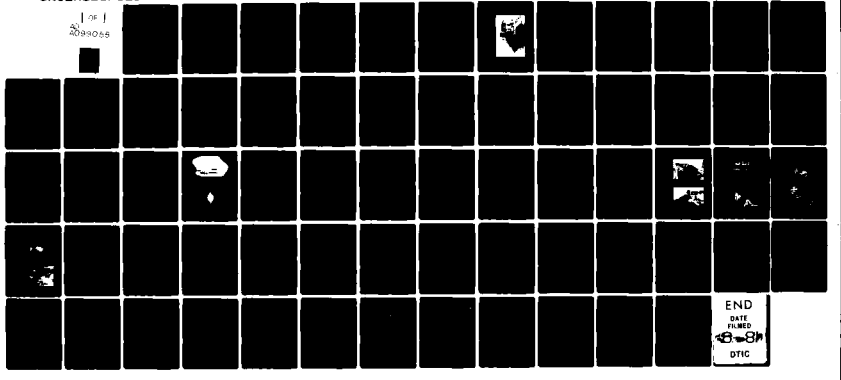

LEVEL II

DELAWARE RIVER BASIN
TRIBUTARY TO MIDDLE CREEK, WAYNE COUNTY

PENNSYLVANIA

BRONSON POND DAM

NDI ID NO. PA-00143
DER ID NO. 64-42

MR. HAYDEN M. BAGNICK

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

DELAWARE RIVER BASIN

MIDDLE CREEK, WAYNE COUNTY

PENNSYLVANIA

(6 National Dam Inspection Program.

BRONSON POND DAM
(NDI ID [redacted] PA 00143
DER ID [redacted] 64-42)

Number

HAYDEN M. BAGNICK

Delaware River Basin,
Middle Creek, Wayne County,
Pennsylvania. Phase I
Inspection Report.

(12) 66

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

Prepared By:

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DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D. C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition, and the downstream damage potential.

NDI ID No. PA-00143 DER ID No. 64-42

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

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APPENDICES

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITION
AND
RECOMMENDED ACTION

NAME OF DAM:	Bronson Pond Dam NDI ID No. 00143 DER ID No. 64-42
SIZE:	Small (8.3 feet high; 385 acre-feet)
HAZARD CLASSIFICATION:	Significant
OWNER:	Mr. Hayden M. Bagnick RD #2 Waymart, Pennsylvania 18472
STATE LOCATED:	Pennsylvania
COUNTY LOCATED:	Wayne
STREAM:	Middle Creek
DATE OF INSPECTION:	4 November 1980

The visual inspection and review of available design and construction information indicate that Bronson Pond Dam is in fair condition. The primary deficiency noted during the inspection was the lack of any spillway or outlet facilities for the dam. Based on the size and hazard classification of the dam, the recommended Spillway Design Flood (SDF) varies between the 100-year flood and one-half the Probable Maximum Flood (PMF). Based on the size of the dam and reservoir, and the downstream conditions, the 100-year flood has been selected as the SDF.

The hydrologic and hydraulic computations indicate that the combinations of reservoir storage and overflow discharge capacity pass the 100-year flood without overtopping the dam. For this reason, the overflow capacity for Bronson Pond Dam is considered to be inadequate.

BRONSON POND DAM

The following studies and remedial measures are recommended to be undertaken by the owner, in approximate order of priority, without delay:

(1) Retain a qualified professional engineer to further assess measures required to provide adequate spillway capacity and evaluate the need for providing a drawdown facility for the dam.

(2) Periodically monitor the seepage through the dam and take appropriate remedial action should any significant change in the flow rate or turbidity occur.

(3) Establish uniform profile and width for the dam crest.

(4) Develop a formal surveillance and downstream emergency warning system for use during periods of heavy or prolonged precipitation.

(5) Prepare an operation and maintenance manual or plan for use as a guide in the operation of the dam during normal and emergency conditions.

(6) Develop and implement a schedule of regular inspections by a qualified engineer.

APPROVED BY:

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS

DATE: 9 APR 81

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

BRONSON POND DAM

Overview
V

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

BRONSON POND DAM

NDI ID NO. PA 00143

DER ID NO. 64-42

SECTION 1

PROJECT INFORMATION

1.1 General.

a. Authority. The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of non-federal dams throughout the United States.

b. Purpose. The purpose of this inspection is to determine if the dam constitutes a hazard to human life and property.

1.2 Description of Project.

a. Description of Dam and Appurtenances.

Note: The U.S.G.S. Quadrangle Sheet (Waymart, PA) indicates a reservoir elevation of 1403, which is used in this report as normal pool elevation.

Bronson Pond Dam is an earth and rockfill structure approximately 8 feet high and 100 feet in length. The dam was constructed at the outlet of a natural lake, with no spillway or other outlet facilities.

Available records indicate the dam was originally constructed as it now appears (without spillway). The owner has been adding random rockfill to the downstream face periodically over the last 55-60 years. All normal inflow currently passes over or through the rockfill structure.

b. Location. South Canaan Township, Wayne County
U.S.G.S. Quandrangle - Waymart, PA
Latitude 41° 31.5'
Longitude 75° 26.2'
Ref. Appendix E, Plate I & II

c. Size Classification. Small: Height - 8.3 feet
Storage - 385 Acre-feet

d. Hazard Classification. Significant (Refer to Section 3.1.E)

e. Ownership. Mr. Hayden M. Bagnick
R.D. #2
Waymart, Pennsylvania 18472

f. Purpose. Recreation

g. Design and Construction History. No information on the original design and construction of the dam are known to exist other than the fact that it was built prior to 1913. The current owner and available records indicate that stone fill has been added to the downstream face on a periodic basis; however, there are no records of any other modifications being made to the dam.

h. Normal Operating Procedure. The reservoir is normally maintained at or near top of dam. Inflow occurring when the lake is at or above top of dam passes over and through the rockfill embankment.

1.3 Pertinent Data.

a. Drainage Area. (square miles)

From files:	3.0
Computed for this report:	2.4
Use:	2.4

b. Discharge at Damsite. (cfs)

Maximum known flood	Unknown
Spillway at maximum pool	N/A

c. Elevation. (feet above msl.)

Note: Reservoir elevation of 1403 shown on Waymart, PA U.S.G.S. quadrangle is used as normal pool elevation.

Top of Dam (low point)	1403.1
Spillway crest	N/A
Streambed at toe	1394.8

d. Reservoir Length. (miles)

Maximum pool (El. 1403.1)	0.42

e. Storage. (acre-feet)

Maximum pool (El. 1403.1)	385

f. Reservoir Surfaces. (acres)

Maximum pool (El. 1403.1)	54

g. Dam.

Note: Refer to plates in Appendix A for profile & section.

Type	Rock with some earthfill.
Crest Length	100 feet.

	Height		8.3 feet.
	Crest Width		20 feet, average.
	Side Slopes	Upstream Downstream	IV:10H 1V:1.7H
	Zoning		None.
	Cutoff		None reported.
	Grouting		None reported.
h.	Outlet Works.		None.
i.	Spillway.		None; excess flow passes over crest.

SECTION 2

ENGINEERING DATA

2.1 Design. The available data for Bronson Pond Dam consists of files provided by the Pennsylvania Department of Environmental Resources (PennDER). Information available includes State inspection reports and various related correspondence. No plans or design details are known to exist.

2.2 Construction. No information is available on the original construction of the dam. PennDER inspection reports and discussion with the current owner indicate that stone fill has been placed on the downstream face periodically over the last 55-60 years. There is no record of any other modifications being made to the dam.

2.3 Operation. No formal records of operation or maintenance exist. The owner lives nearby and visits the dam regularly. Any maintenance found to be necessary is performed by the owner. A PennDER eport in July 1917 recommended that a spillway be provided for the dam, which apparently was never accomplished.

2.4 Evaluation.

a. Availability. All available written information and data was contained in the permit files provided by PennDER.

b. Adequacy. The available data, including that collected during the recent detailed visual inspection, are considered to be adequate to make a reasonable assessment of the dam.

SECTION 3

VISUAL OBSERVATIONS

3.1 Observations.

a. General. The overall appearance of the dam is fair. There is no spillway or outlet works to prevent excess runoff from flowing over the dam crest. Maintenance appears to consist of periodic dumping of additional rock on the dowmstream face. On the day of inspection the pool was at its normal level of about 0.1 feet below the crest.

The visual inspection checklist and sketches of the general plan, profile and section of the dam, as surveyed during the inspection, are presented in Appendix B. The survey datum is the reservoir elevation obtained from the U.S.G.S. Waymart, PA quadrangle map dated 1946. Mr. Hayden M. Bagnick, owner, accompanied the inspection team.

Photographs taken on the day of inspection are reproduced in Appendix C.

b. Dam. The crest and downstream slope are rough and irregular consisting of dumped field stone that vary in size from a few inches up to one foot. The 20 foot crest width varies due to the random placement of stones on the downstream face. The owner states that he adds some stones to the downstream face each spring. The slope of the downstream face averages 1V:1.7H with localized areas 3 to 4 feet wide having slopes of 1V:1H. The upstream face is very flat with a slope of 1V:10H.

Since there is no outlet works or spillway, all excess runoff must flow over the crest of the dam. Three logs and two tree stumps, which are on the upstream side of the crest, may obstruct flows over the crest until sufficient depth is reached to dislodge and remove them.

Water can be heard flowing through the rocks near the downstream toe. This flow, which is clear, exits the rocks about 50 feet downstream of the toe and is estimated to flow at a rate of approximately 4 gallons per minute.

Two large trees, two and one-half feet in diameter, are growing on the right abutment adjacent to the crest. Additional trees are growing on the abutments adjacent to the downstream face.

c. Appurtenant Structures. There is no outlet works or spillway for this dam. All excess runoff flows over the crest of the dam.

d. Reservoir Area. The reservoir area has relatively flat, wooded side slopes with no residential development. These slopes appear stable with no potential for slides. Sedimentation is not reported to be a problem for this lake.

e. Downstream Channel. The first 1,200 feet of the downstream channel is a tree lined pool 20-30 feet wide which is formed by a small masonry dam near the owner's house. Approximately 4,400 feet below the dam one house and one mobile home are located on opposite sides of the stream with first floor levels approximately 9 feet above the streambed. The channel then passes under a road and meanders to Lake Quinn, one mile downstream of Bronson Pond Dam. Based on these observations, Bronson Pond Dam is judged to present a significant hazard to loss of life in the event of a dam failure.

f. Evaluation. The fact that there is no formal spillway causes concern for the ultimate integrity of this impoundment; however, the large mass of rock which has been placed on the dam over the years would

make it highly unlikely that a catastrophic failure due to overtopping could occur. Overtopping the dam could cause a gradual, progressive failure.

The flow rate does not appear to be an excessive amount for a dam of rockfill construction, but should be monitored to detect any significant increases in flow.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Normal Operating Procedure. The facility has no regulating capability. No outlet facility or spillway exists. Inflow into the reservoir is stored until seepage and evaporation lower the pool level. Inflows of sufficient volume overtop the embankment when the storage capacity of the reservoir is exceeded. No formal operations manual exists.

4.2 Maintenance of Dam. The condition of the dam as observed by the inspection team is fair. Basic maintenance such as keeping the embankment clear is performed by the owner. No formal maintenance manual exists.

4.3 Maintenance of Operating Facilities. No operating facilities exists.

4.4 Warning System. No formal warning system exists.

4.5 Evaluation. Maintenance of the facility appears to be adequate at this time. No means currently exist to lower the elevation of the lake if necessary, nor does any spillway facility exist. Formal manuals of maintenance and operation are recommended to ensure that all needed maintenance is identified and performed regularly. In addition, a formal warning system for the protection of downstream inhabitants should be developed. Included in the plan should be a provision for around-the-clock surveillance of the facility during periods of unusually heavy precipitation.

SECTION 5

HYDROLOGIC/HYDRAULIC EVALUATION

5.1 Design Data. No design reports, calculations or miscellaneous design data are available for the facility. However, in 1917 calculations were determined for the "equalizing potential" of Bronson Pond Dam on a downstream structure. Data developed in that report is contained in PennDER files.

5.2 Experience Data. Records of reservoir levels are not available. Discussion with the owner indicated that the dam had been overtopped, by up to 1.5 feet during the May 1942 flood. No other overtoppings have been reported. No other records of past performance are known to exist.

5.3 Visual Observations. On the date of the inspection, no conditions were observed that would prevent the facility from operating as an overflow weir. Since there are no operating facilities or spillway, normal inflow is stored until seepage and evaporation lower the pool level. Inflows larger than the storage capacity of the reservoir overtop the embankment.

5.4 Method of Analysis. The facility has been analyzed in accordance with procedures and guidelines established by the U.S. Army, Corps of Engineers, Baltimore District, for Phase I hydrologic or hydraulic evaluations. This analysis has been performed using a modified version of the HEC-1 program developed by the U.S. Army, Corps of Engineers, Hydrologic Engineering Center, Davis, California. Capabilities of the program are briefly outlined in the preface contained in Appendix D.

5.5 Summary of Analysis.

a. Spillway Design Flood (SDF). In accordance with the procedures and guidelines contained in the National Guidelines for Safety Inspection of Dams for Phase I Investigation, the SDF for Bronson Pond Dam ranges between the 100 year flood and one-half Probable Maximum Flood (PMF). This classification is based on the relative size of the dam (small) and the potential hazard of dam failure to downstream development (significant). Due to the small storage (less than 400 ac. ft.) and small height of the dam (less than 10 feet) the SDF selected was the 100 year flood.

b. Results of the Analysis. Bronson Pond Dam was evaluated under near normal operating conditions. The starting lake elevation was set at Elevation 1403. The top of embankment (low point) was Elevation 1403.1. Since there are no regulating facilities or spillway, inflow is stored until excess flow overtops the embankment and flows downstream. The drainage area above Bronson Pond Dam is approximately 2.4 square miles.

Development of the 100 year flood peak is derived by using Technical Paper-40 (TP-40) hypothetical rainfall, and the 100 year regression equation for the Delaware River Basin - Regional Frequency Study, Upper Delaware, New York District, 1975. Parameters are determined and input into the regression equation to develop the 100 year flood peak. TP-40 rainfall is then input into the HEC-1 program and loss rates are adjusted until the peak inflow in the HEC-1 program is within 10% of the value found in the regression equation. Results are as follows:

Regression Equation Peak: 950 CFS

Peak Inflow HEC-1: 1030 CFS

(Note: This is within 10%, which is considered acceptable) Results of routing the 100 year flood through Bronson Pond Dam indicated that the embankment would be overtopped to a maximum depth of 2.1 feet for a total duration of overtopping of 26 hours.

Since the structure is a significant hazard, no breach analysis is required.

5.6 Spillway Adequacy. Under existing conditions Bronson Pond Dam cannot accommodate the 100 year flood (SDF). Since this structure is a significant hazard, and no formal spillway exists, the embankment was evaluated as an overflow section, and is rated inadequate.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations.

(1) Embankment. Visual observations of Bronson Pond Dam indicate that the dam is in fair condition. The dam is constructed of earth and field stones varying in size from a few inches up to 1 foot. It is approximately 8 feet high, has an average crest width of 20 feet, and a downstream slope of 1.7 H:1V. Since the pond is a natural lake, the upstream slope is mild at 10H:1V. Clear water is seeping through the embankment stone at approximately 4 gpm.

(2) Appurtenant Structures. There is no outlet works or spillway.

b. Design and Construction Data.

(1) Embankment. None

(2) Appurtenant Structures. None

c. Operating Records. None. No structures exist to be operated.

d. Post Construction Changes. No formal construction changes have been made. However, field stones have been dumped on the dam from time to time. This has widened the crest to an average width of 20 feet and slightly increased the height.

e. Seismic Stability. The dam is located in Seismic Zone 1. Based on visual observations, it is statically stable. Therefore, the seismic stability is considered adequate.

SECTION 7

ASSESSMENT AND RECOMMENDATIONS

7.1 Dam Assessment.

a. Safety. The visual inspection and review of available design and construction information indicate that Bronson Pond Dam is in fair condition. The primary deficiency noted during the inspection was the lack of any spillway or outlet facilities for the dam.

The hydrologic and hydraulic computations indicate that the combination of reservoir storage and overflow discharge capacity cannot pass the SDF (100-year flood) without overtopping the dam. Therefore, in accordance with guidance outlined and evaluated in Section 5.5 the overflow capacity for Bronson Pond Dam is considered to be inadequate.

b. Adequacy of Information. The available information contained in PennDER files, in conjunction with data collected during the visual inspection, are considered to be adequate for making a reasonable assessment of this dam.

c. Urgency. The recommendations presented below should be implemented without delay.

d. Necessity for Additional Studies. The results of this inspection indicate a need to develop plans for providing adequate spillway capacity for this dam.

7.2 Recommendations.

a. The owner should retain a qualified professional engineer to further assess measures required to provide adequate spillway capacity and evaluate the need for providing a drawdown facility for the dam.

b. The seepage through the dam should be periodically monitored, and appropriate remedial action taken should any significant turbidity or change in the flow rate occur.

c. A uniform profile and width should be established for the dam crest.

d. A formal surveillance and downstream emergency warning system should be developed for use during periods of heavy or prolonged precipitation.

e. An operation and maintenance manual or plan should be prepared for use as a guide in the operation of the dam during normal and emergency conditions.

f. A schedule of regular inspection by a qualified engineer should be developed.

APPENDIX A

CHECKLIST - VISUAL INSPECTION

CHECKLIST

VISUAL INSPECTION

PHASE I

Name of Dam: Bronson Pond Dam County: Wayne State: Pennsylvania

Date(s) Inspection: 4 November 1980 Weather: Cloudy Temperature: 50°

Pool Elevation at Time of Inspection: 1403.0 msl Tailwater at Time of Inspection: 1394.8 msl

Inspection Personnel:

J. Bianco (C.O.E.)
E. Hecker (C.O.E.)
H. M. Bagnick, Owner
J. Evans (C.O.E.)
B. Cortright (C.O.E.), Recorder

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS
CREST ALIGNMENT: Horizontal Vertical	Irregular due to random placement of rock. Varies 0.7' between high and low points.
SURFACE CRACKS:	None observed
JUNCTION OF EMBANKMENT WITH: Abutments Spillway	Good, trees on right end. Dam crest acts as ungated spillway.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	Unable to determine due to nature of structure. Rock is dumped periodically at random on downstream face.
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None observed.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS
FOUNDATION	Unknown - not observed.
RIPRAP FAILURES	No formal riprap - Dam surface is all rock of various sizes.
ANY NOTICEABLE SEEPAGE	Water can be heard trickling through rocks just beyond d/s toe. Water seen exiting rocks 50' beyond toe at rate of approximately 4 gpm clear.
INSTRUMENTATION	None.
MISCELLANEOUS	Several large trees on right abutment up to 2.5 feet in diam. Brush and trees on d/s face at left abutment.

SPILLWAY

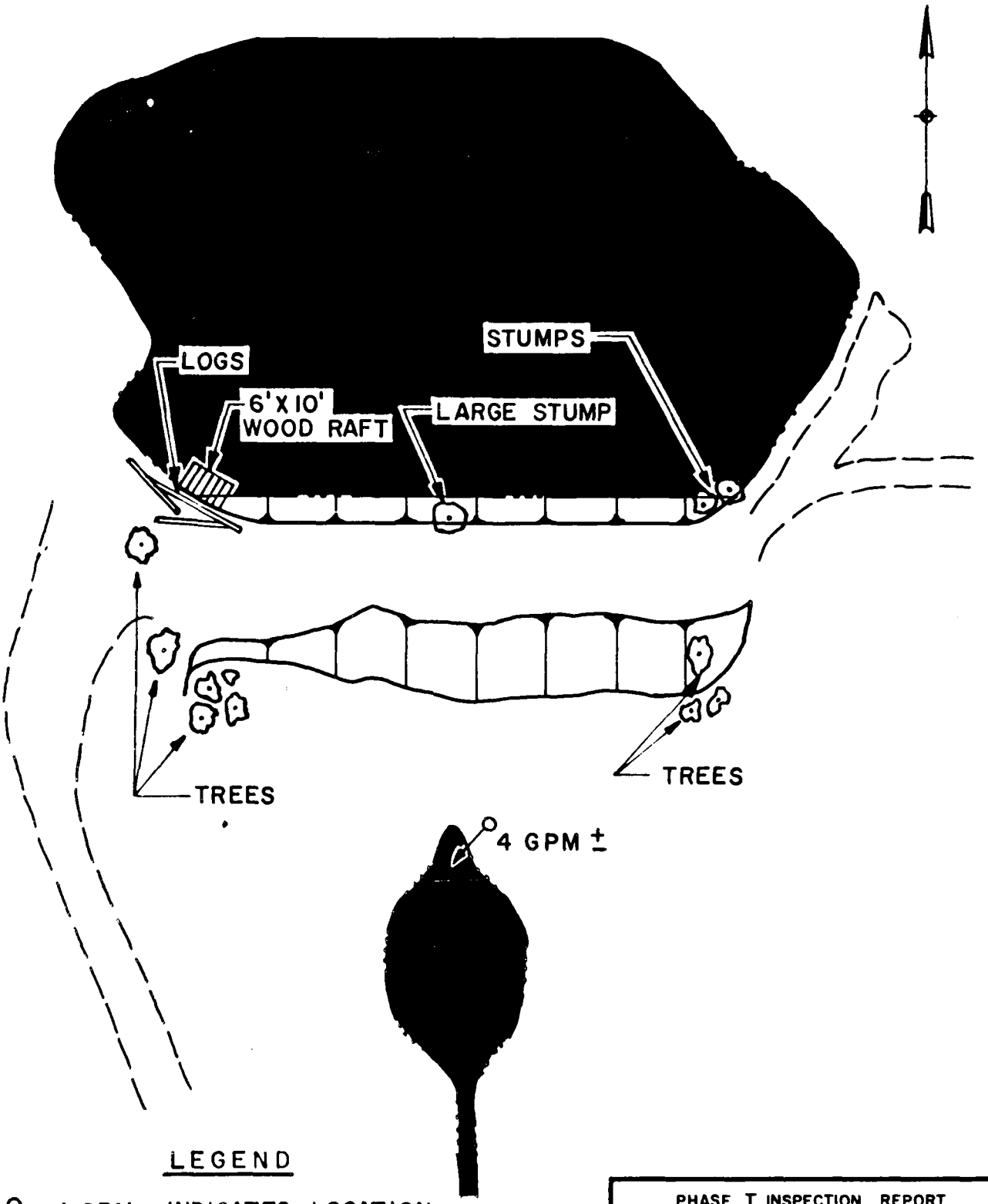
VISUAL EXAMINATION OF	OBSERVATIONS
WEIR	No formal control. Broad crested; entire crest of dam acts as spillway.
APPROACH CHANNEL	Reservoir; bottom slopes @ 1V:10H. Partially obstructed by logs and stumps that have floated in.
DISCHARGE CHANNEL	Rock lined - trees on side slopes.

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS
SLOPES	Flat to moderate; wooded. No residential development. Appear stable.
SEDIMENTATION	None observed or reported.

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS
CONDITION: Obstructions	Trees along stream banks. Small dam 1,200' downstream and large highway culvert 1,700' from dam; road crossing @ 4,500' from dam. Lake Quinn is 1.0 mile downstream of Bronson Pond Dam.
SLOPES: Channel Sides	 Flat in channel. Flat to 1V:2H.
APPROXIMATE NUMBER OF HOMES	Two houses 4,400 feet downstream approximately 9 feet above streambed.



LEGEND

4 GPM INDICATES LOCATION AND QUANTITY OF SEEPAGE

NOT TO SCALE

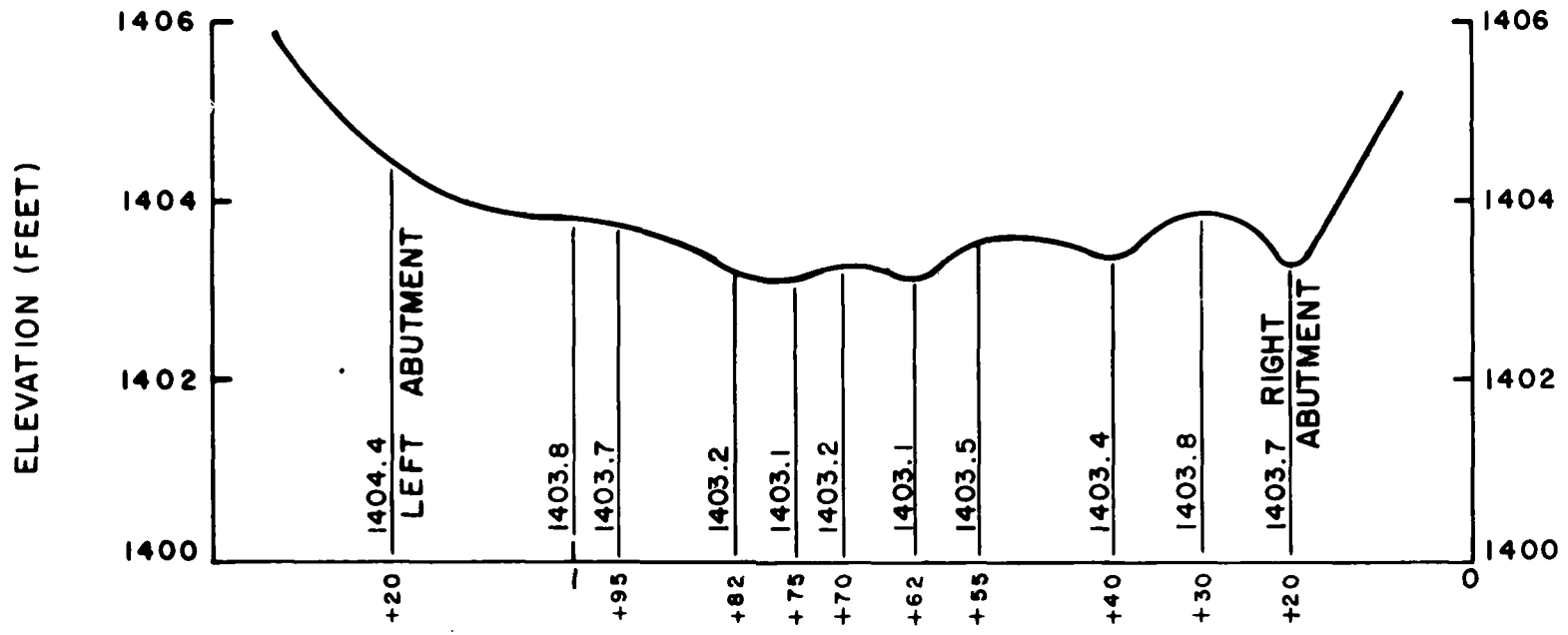
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

BRONSON POND DAM

HAYDEN M. BAGNICK

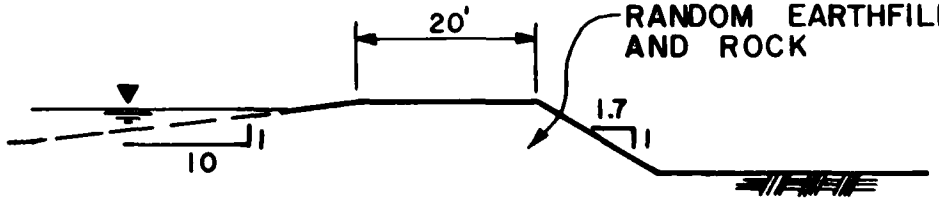
FIELD SKETCH

EXHIBIT A-1



TOP OF DAM–PROFILE

SCALE- HORIZ.: 1 IN. = 20 FT.
VERT.: 1 IN. = 2 FT.



EMBANKMENT SECTION

SCALE: 1 IN. = 20 FT.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

BRONSON POND DAM

HAYDEN M. BAGNICK

PROFILE AND SECTION

EXHIBIT A-2

APPENDIX B

CHECKLIST - ENGINEERING DATA

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

NAME OF DAM Bronson Pond Dam

NDI ID # PA 00143

DER ID # 64-42

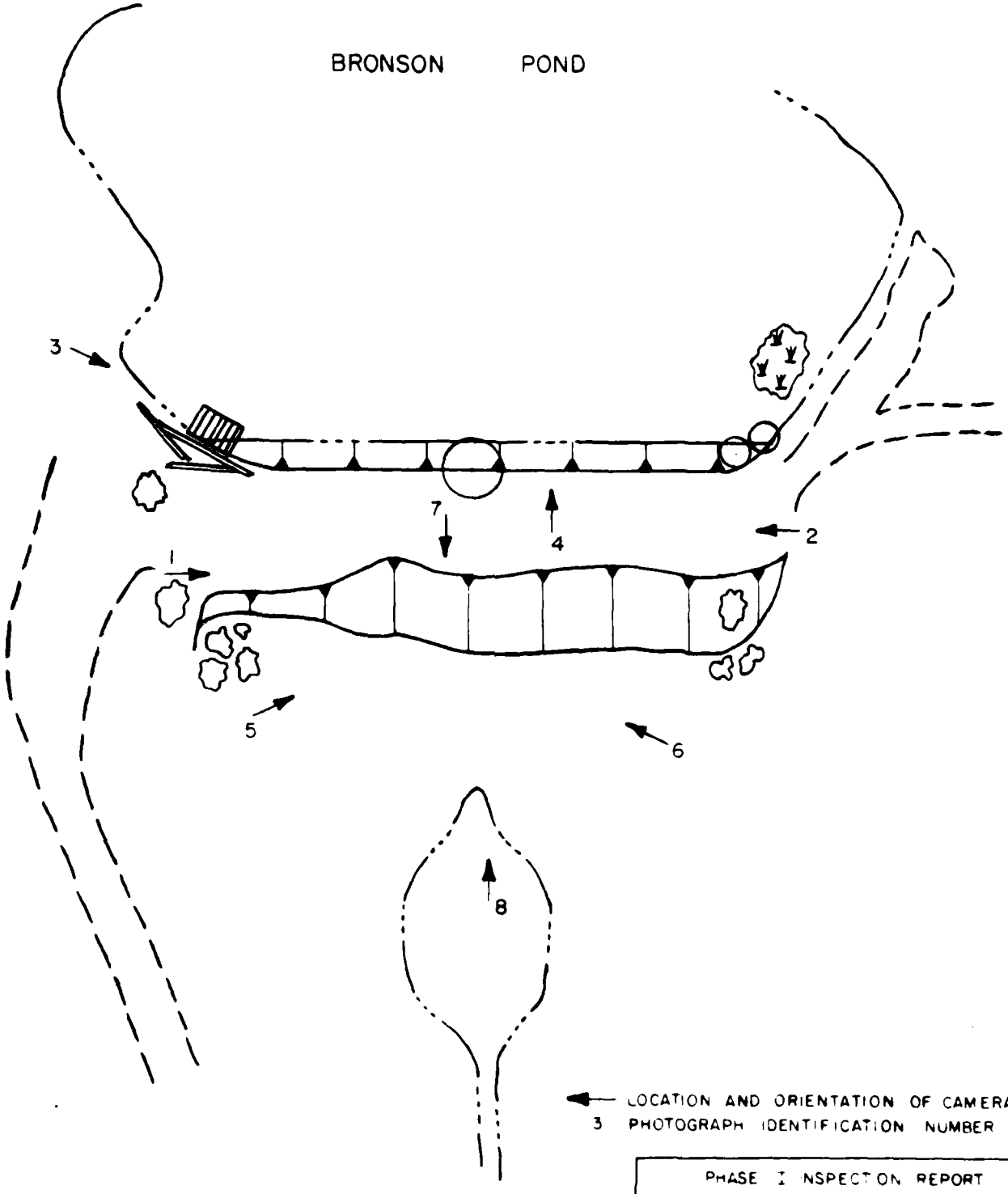
ITEM	REMARKS
As-Built Drawings	None
Regional Vicinity Map	U.S.G.S. Waymart Quadrangle 7 1/2 minute Quad Sheet. See Appendix E, Plate E-2.
Construction History	Original embankment completed prior to report filed in 1917. Stone fill added to downstream face on periodic basis, over period of 55-60 years.
Typical Sections of Dam	None
Outlets - Plan Details Constraints Discharge Ratings	N/A
Rainfall/Reservoir Records	None
Design Reports	None
Geology Reports	None

ITEM	REMARKS
Design Computations Hydrology & Hydraulics Dam Stability Seepage Studies	In 1917 a report was filed to the state for a proposed change at a downstream structure, W.W. Kiser's dam (File No. 64-46) 2.75 miles downstream of Bronson Pond Dam. This report included in its study the equalizing potential of Bronson Pond on this downstream structure.
Materials Investigations Boring Records Laboratory Field	None
Post-Construction Surveys of Dam	None
Monitoring Systems	None
Modifications	Additional fill had been added on the downstream face from time to time.
High Pool Records	Dam overtopped in May 1942, to a height of approximately 1.5 feet.
Post-Construction Engineering Studies and Reports	The 1917 report for proposed changes to W.W. Kiser's Dam included an Hydrologic evaluation of this dam for equalizing potential.
Prior Accidents or Failure of Dam Description Reports	None reported.
Maintenance Operation Records	None

ITEM	REMARKS
Spillway Plan	N/A
Sections Details	
Operating Equipment Plans & Details	N/A
Specifications	None
Miscellaneous	None
Previous Inspections	1965 (PennDer) 1952, 1948, 1938, 1933, 1927, by State Personnel. Requested a spillway to be built as none exist.

APPENDIX C

PHOTOGRAPHS



← LOCATION AND ORIENTATION OF CAMERA
3 PHOTOGRAPH IDENTIFICATION NUMBER

NOT TO SCALE

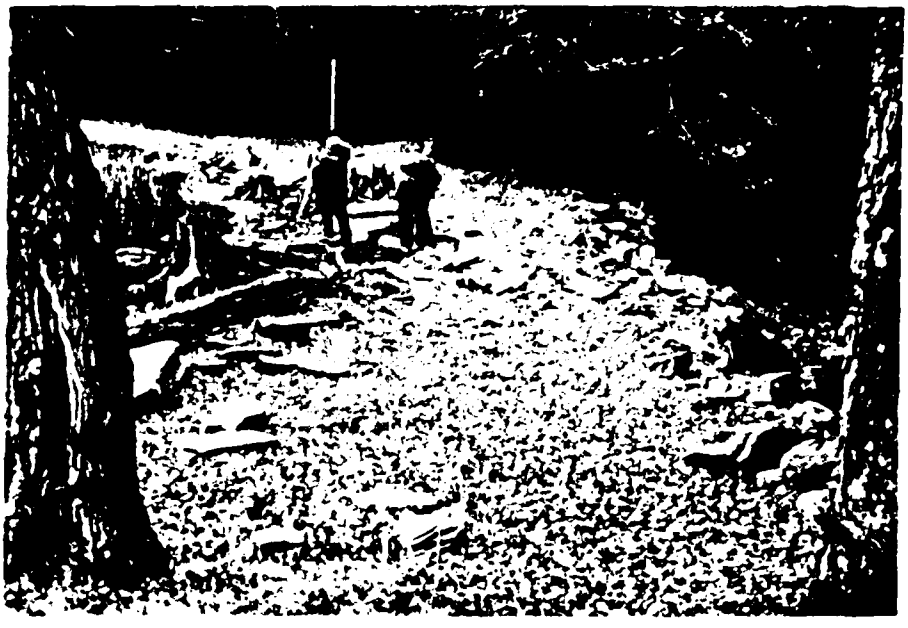
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

BRONSON POND DAM

HAYDEN M BAGNICK

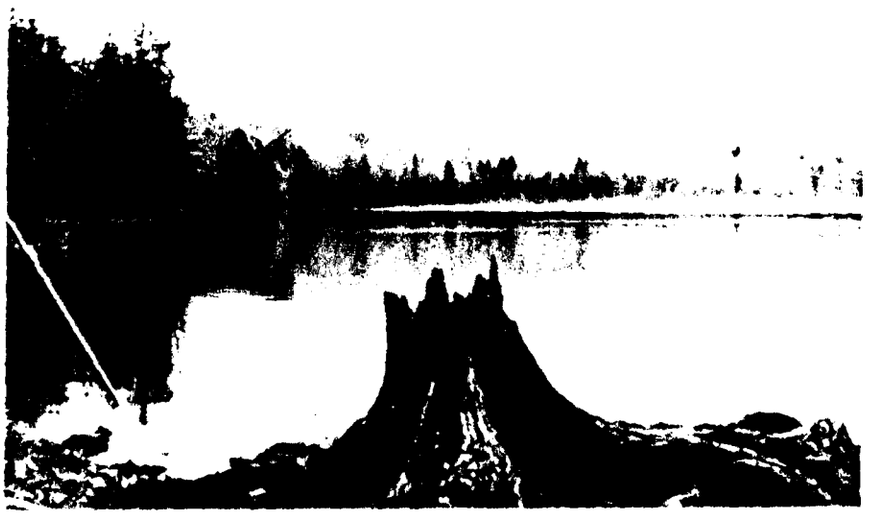
PHOTOGRAPH
LOCATION PLAN

EXHIBIT C-1

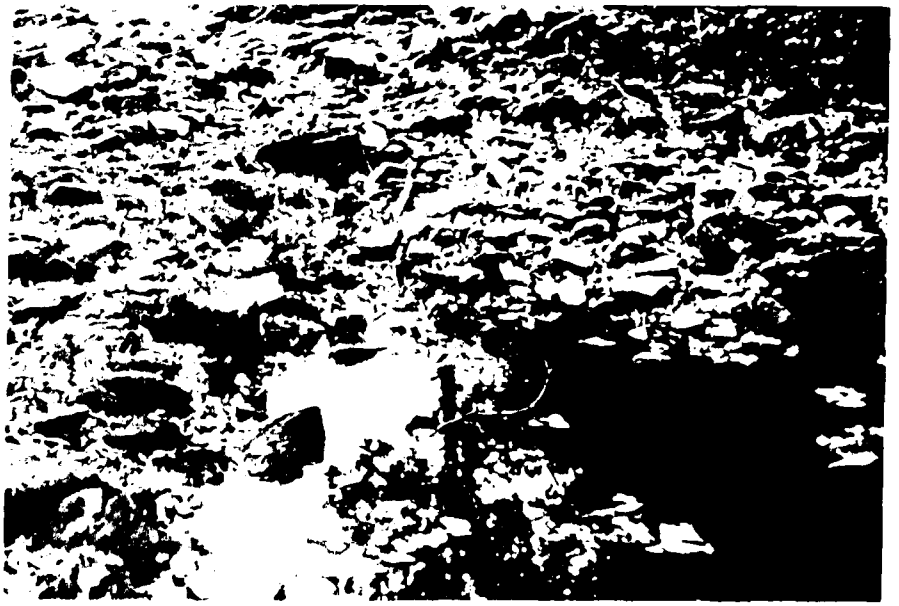


[illegible] Embankment crest and left abutment.

[illegible]



7. Downstream channel [illegible]



8. Seepage [illegible]

APPENDIX D

HYDROLOGY AND HYDRAULICS

PREFACE

The modified HEC-1 program is capable of performing two basic types of hydrologic analyses: 1) the evaluation of the overtopping potential of the dam; and 2) the estimation of the downstream hydrologic-hydraulic consequences resulting from assumed structural failures of the dam. Briefly, the computational procedures typically used in the dam overtopping analysis are as follows:

a. Development of an inflow hydrograph(s) to the reservoir.

b. Routing of the inflow hydrograph(s) through the reservoir to determine if the event(s) analyzed would overtop the dam.

c. Routing of the outflow hydrograph(s) from the reservoir to desired downstream locations. The results provide the peak discharge(s), time(s) of the peak discharge(s), and the maximum stage(s) of each routed hydrograph at the downstream end of each reach.

The evaluation of the hydrologic-hydraulic consequence resulting from an assumed structural failure (breach) of the dam is typically performed as shown below.

a. Development of an inflow hydrograph(s) to the reservoir.

b. Routing of the inflow hydrograph(s) through the reservoir.

c. Development of a failure hydrograph(s) based on specified breach criteria and normal reservoir outflow.

d. Routing of the failure hydrograph(s) to desired downstream locations. The results provide estimates of the peak discharge(s), time(s) to peak and maximum water surface elevations of failure hydrographs for each location.

HYDROLOGY & HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: BRONSON POND DAM

PROBABLE MAXIMUM PRECIPITATION (PMP) = N/A - 100 YEAR FLOOD ANALYSIS INCHES/24 HOURS

DELAWARE RIVER BASIN

STATION	1	2	3
STATION DESCRIPTION	BRONSON POND DAM		
DRAINAGE AREA (SQUARE MILES)	2.38		
CUMULATIVE DRAINAGE AREA (SQUARE MILES)	2.38		
ADJUSTMENT OF PMF FOR DRAINAGE AREA LOCATION (%) 6 Hours 12 Hours 24 Hours 48 Hours 72 Hours	N/A (100 YEAR FLOOD ANAL.)		
SNYDER HYDROGRAPH PARAMETERS Zone C_p C^t L^t (MILES) L_{ca} (MILES $tp = C_t (L \cdot L_{ca})\ 0.3$ (HOURS)	 1 0.45 1.23 2.92 1.33 1.85		
SPILLWAY DATA CREST LENGTH (FEET) FREEBOARD (FEET)	ROCK FILL DAM N/A N/A		

(1) HYDROMETEOROLOGICAL REPORT - 33, U. S. Army Corps of Engineers, 1955.

(2) Hydrologic zone defined by Corps of Engineers, Baltimore District, For Determination of Snyder Coefficients (C_p and C_t).

(3) Snyder Coefficients

(4) L = Length of longest watercourse from dam to basin divide.
L_{ca} = Length of longest watercourse from dam to point opposite basin centroid.

BALTIMORE DISTRICT, CORPS OF ENGINEERS PAGE D-7

SUBJECT DAM SAFETY INSPECTION

COMPUTATIONS BRONSON'S POND SHEET 1 OF 10 SHEETS

COMPUTED BY JPB CHECKED BY DATE 12-10-82

DAM CLASSIFICATION:

SIZE OF DAM - Small
HAZARD - Significant
REQUIRED SDF - 100 YEAR TO ½ PMF

DAM STATISTICS:

HEIGHT OF DAM - 8.3 FT
STORAGE AT NORMAL POOL - 380 AC-FT
STORAGE AT TOP OF DAM - 385 AC-FT
DRAINAGE AREA ABOVE DAMSITE - 2.38 mi²

ELEVATIONS *

TOP OF DAM LOW POINT (FEILD) - 1403.1
NORMAL POOL - 403.0
STREAMBED AT CENTERLINE OF DAM - 395.0

HYDROGRAPH PARAMETERS:

RIVER BASIN - DELAWARE
ZONE - 1
SNYDER COEFFICIENTS:

C_p - 0.45
C_t - 1.23

MEASURED PARAMETERS - DETERMINED FROM [illegible] WAYMART QUAD SHEET

L = LENGTH OF THE LONGEST WATERCOURSE: L = 2.72 mi.
L_{CA} = LENGTH OF THE LONGEST WATERCOURSE TO CENTROID OF BASIN: L_{CA} = 1.33 m.

* - NOTE. ELEVATIONS ARE REFERENCED TO U.S.G.S QUAD SHEET WAYMART, PA. GIVING LAKE ELEVATION AT 1403 ASSUMED TO BE NORMAL POOL.

ADD FORM 1232, 28 MAR 74

SUBJECT DAM SAFETY INSPECTION

COMPUTATIONS BRONSON'S POND SHEET 2 OF 12 SHEETS

COMPUTED BY JPB CHECKED BY DATE 12-11-80

t_p = SNYDERS BASIN LAG TIME TO PEAK IN HOURS

$$t_p = C_t (L L_{CA})^{0.3}$$
$$= 1.23 (2.92 (1.33))^{0.3}$$
$$= 1.85 \text{ hours}$$

RESERVOIR CAPACITY

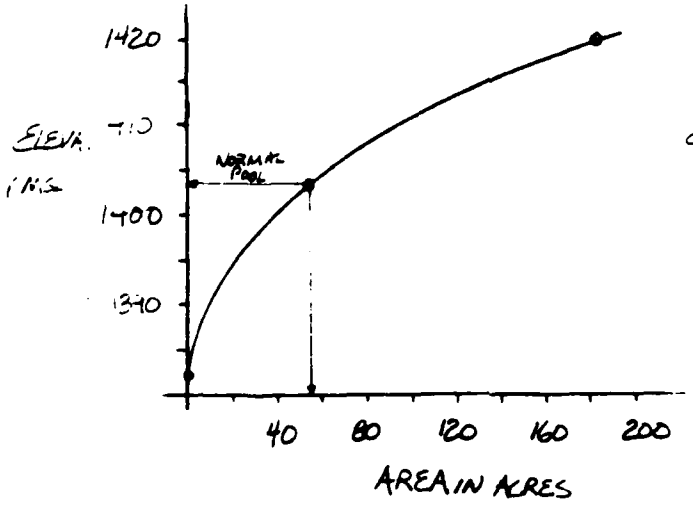
- SURFACE AREA AT NORMAL POOL (EL 1403) = 54 ACRES
- SURFACE AREA AT ELEVATION 1420 = 184 ACRES

ASSUME CONICAL METHOD APPLIES TO FIND LOW POINT IN POOL, BELOW NORMAL POOL.

VOLUME AT NORMAL POOL = 380 AC. FT. (FROM RESERVOIR FILE)

$V = \frac{1}{3} A h$ $A = \pi r^2 =$

$\therefore h = \frac{3V}{A} = \frac{3(380)}{54} = 21.$ (LOW POINT AT 38)



ELEVATION-AREA CURVE

FOR FLOOD ROUTING PURPOSES, ASSUME THE AVERAGE END AREA METHOD IS SUITABLE TO ELEVATIONS ABOVE NORMAL POOL - EL. 1403.

$$\Delta V = \left(\frac{A_1 + A_2}{2}\right) \Delta h$$

NADB FORM 1232, 28 MAR 74

SUBJECT DAM SAFETY INSPECTION

COMPUTATIONS BRONSON'S POND SHEET 3 OF 10 SHEETS

COMPUTED BY JPB CHECKED BY DATE 12-11-80

ELEVATION - STORAGE TABLE

ELEVATION (MSL)	AREA (ACRES)	ΔH	$\Delta V = \left(\frac{A_1 + A_2}{2}\right)\Delta h$	CUMULATIVE VOLUME (AC.-FT.)	
					CURVE
1382	0	—	(conical method) 380	0	0
1403	54	2	116	380	385
1405	62	5	390	496	500
1410	94	5	605	886	890
1415	148	5	830	1491	1490
1420	184			2321	2320

NOTE: DRAINAGE AREA ABOVE DAM = 2.38 mi²

1" OF RUNOFF FROM THE BASIN ⇒ VOLUME = AREA × DEPTH CONVERTED TO AC.

$\therefore \left(1in.\right)\left(\frac{1ft}{12in.}\right)\left(2.38mi^2\right)\left(640\frac{ac.}{mi^2}\right) = V \cong 127 AC\text{-}FT$

AT TOD 1403.1 THE STORAGE IS APPROXIMATELY 385 AC.-FT.

$\therefore$

ELEVATION (MSL)	STORAGE (AC-FT)	
1382.0	0	DATA TO BE INPUT ON $S & $E CARD.
1403.0	380	
1403.1 (TOD)	385	
1405.0	500	
1410.0	890	
1415.0	1490	
1420.0	2320	

NADB FORM 1232, 28 MAR 74

BALTIMORE DISTRICT, CORPS OF ENGINEERS PAGE _____

SUBJECT DAM SAFETY INSPECTION

COMPUTATIONS ATKINSON POND SHEET 1 OF 10 SHEETS

COMPUTED BY PB CHECKED BY _____ DATE 3-5-81

SDF: BASED ON THE SMALL HEIGHT OF DAM AND THE SMALL STORAGE, THE SDF SELECTED FOR THIS POND WAS THE 100 YEAR FLOOD. THIS IS IN ACCORDANCE WITH THE GUIDENCE PROVIDED.

∴ USE SDF = 100 YEAR FLOOD

RAINFALL FOR 100 YEAR PRECIPATION IS SHOWN ON PAGE A-10 AND PAGE A-11.

PMP CALCULATIONS:

SINCE THE SDF SELECTED FOR THIS POND HAS BEEN THE 100 YEAR FLOOD, NO CALCULATIONS ARE NECESSARY TO COMPUTE THE PROBABLE MAXIMUM PRECIPATATION (PMP) OR THE PROBABLE MAXIMUM FLOOD (PMF).

NADB FORM 1232, 28 MAR 74

SUBJECT DAM SAFETY INSPECTION

COMPUTATIONS BRONSON'S POND SHEET 5 OF ____ SHEETS

COMPUTED BY JPB CHECKED BY ____ DATE 12-11-80

EMERGENCY SPILLWAY CAPACITY:

SINCE THERE IS NO FORMAL SPILLWAY STRUCTURE THERE ARE NO CALCULATIONS HERE. HOWEVER, THE ENTIRE DAM IS A ROCK FILL AND WOULD ACT AS A BROAD-CRESTED WEIR. THE EMBANKMENT RATING CURVE IS COMPUTED IN THE FOLLOWING SECTION.

EMBANKMENT RATING CURVE:

THIS ANALYSIS ASSUMES THAT THE EMBANKMENT BEHAVES AS A BROAD CRESTED WEIR. IF OVERTOPPING OCCURS DISCHARGE CAN BE ESTIMATED BY:

$$Q = C L_1 H_w^{3/2}$$

WHERE:

Q = DISCHARGE OVER EMBANKMENT IN CFS

L_1 = LENGTH OF EMBANKMENT OVERFLOW IN FEET

H_w = WEIGHTED HEAD IN FEET, AVERAGE FLOW AREA WEIGHTED ABOVE LOW POINT OF DAM

C = COEFFICIENT OF DISCHARGE

$C = 2.85$ FROM VARNELL & NAGLER FOR BROAD CRESTED WEIR

LENGTH OF EMBANKMENT INUNDATED VS. RESERVOIR ELEVATION:

RESERVOIR ELEVATION (MSL)	EMBANKMENT LENGTH (ft)
1403.1	0
1403.2	14
1403.6	60
1404.0	100
1405.0	115
1410.0 *	130
1415.0 *	130
1420.0 *	130

BALTIMORE DISTRICT CORPS OF ENGINEERS

COMPUTED BY JJC

* ASSUME CONSERVATIVELY THAT MINIMUM LENGTH EMBANKMENT AT ELEV 1410. NOTE THAT ELEVATION IS 0.1 FEET ABOVE TOL

EMBANKMENT RATING TABLE

RESERVOIR ELEVATION (MSL)	L1 (FT)	L2 (FT)	AVERAGE HEAD (HW) (FT)	THEORETICAL FLOW (CFS)	REDUCTION FACTOR	ACTUAL FLOW (CFS)
1403.1	0	—	—	—	—	—
1403.2	14	0	0.1	0.5	1.0	0.5
1403.6	60	14	0.4	4.0	0.5	2.3
1404.0	100	60	1.4	30.0	0.15	4.5
1405.0	115	100	2.0	85.5	0.55	47.0
1410.0*	130	115	5.0	335.0	0.30	100
1415.0*	130	130	5.0	450.0	0.75	3300
1420.0*	130	130	5.0	450.0	5.0675	23500

* - SEE ABOVE

① $A_c = H_c [(L_1 + L_2)/2]$

② $H_w = A_T / L_1$

③ $Q = C L_1 H_w^{3/2}$

DATA TO BE INPUT ON Y4 & Y5 CARDS

RESERVOIR ELEVATION (MSL)	TOTAL OUTFLOW (CFS)
1403.1	0
1403.2	0.5
1403.6	2.3
1404.0	4.5
1405.0	47.0
1410.0	100
1415.0	3300
1420.0	23500

MADB FORM 232, 28 MAR 74

BALTIMORE DISTRICT CORPS OF ENGINEERS PAGE D-10

SUBJECT DAM SAFETY INSPECTION

COMPUTATIONS BRONSON'S POND SHEET 7 OF 9 SHEETS

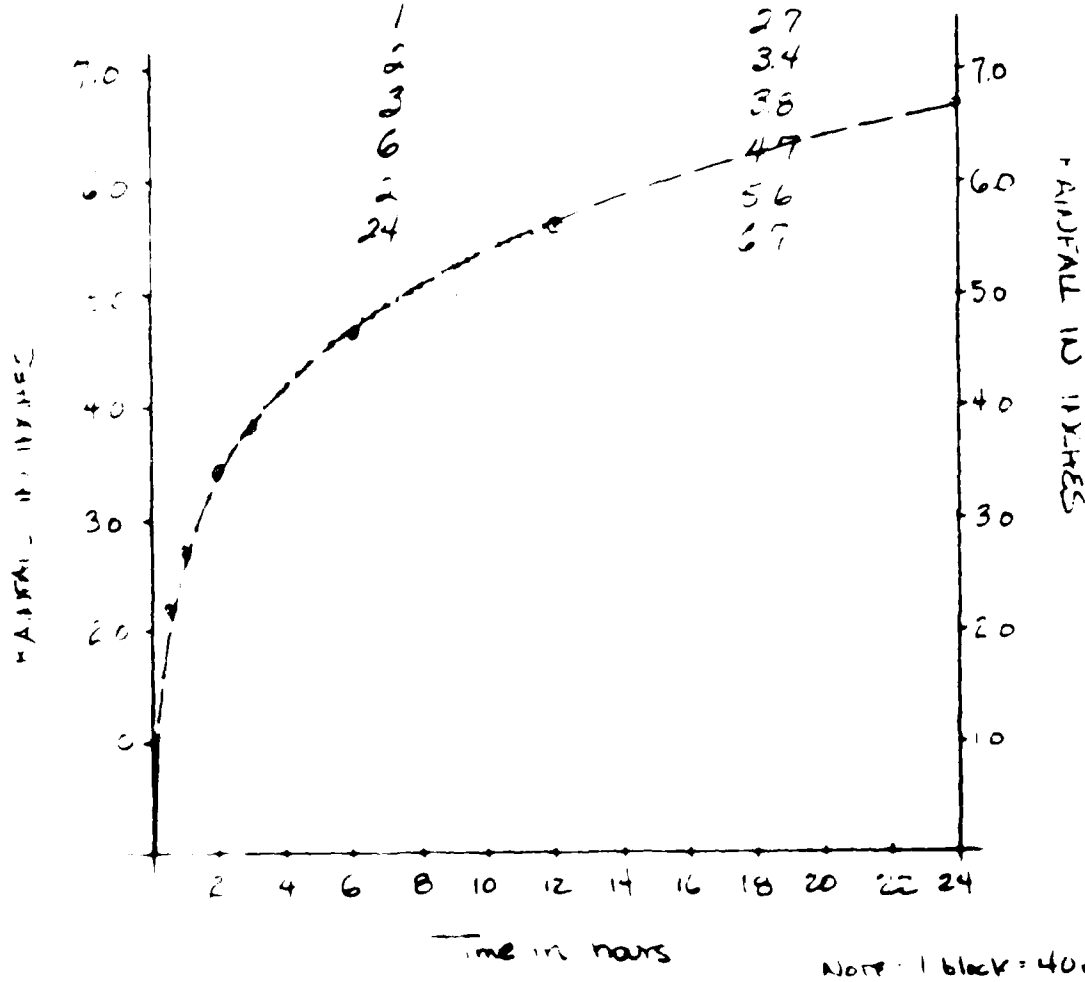
COMPUTED BY JPC CHECKED BY DATE 12-11-80

100 YEAR FLOOD ANALYSIS:

THE SELECTED SDF FOR BRONSON'S POND HAS BEEN SELECTED TO BE THE 100 YEAR FLOOD. THIS IS BASED ON THE SIZE AND HAZARD CATAGORY.

TO DEVELOP THE 100 YEAR FLOOD, THE RAINFALL MUST FIRST BE DETERMINED. THIS CAN BE DONE BY USING D-40 AND PLOTTING THE MASS CURVE OF RAINFALL AS FOLLOWS

DURATION (HRS)	MAXIMUM 100 YEAR RAINFALL (INCHES)
30 min	2.2
1	2.7
2	3.4
3	3.8
6	4.7
12	5.6
24	6.7



NOTE: 1 block = 40 min
½ block = 20 min

BALTIMORE DISTRICT, CORPS OF ENGINEERS

SUBJECT DAM SAFETY INSPECTION

COMPUTATIONS BRONSON'S POND SHEET 8 OF 9 SHEETS

COMPUTED BY JPB CHECKED BY DATE 12-12-80

CALCULATIONS TO DETERMINE 100 YEAR RAINFALL PATTERN

TIME	TOTAL RAINFALL	INCREMENTAL
0.33	1.60	1.60
0.66	2.00	0.40
1.00	2.40	0.40
1.33	2.95	0.35
1.66	3.20	0.25
2.00	3.40	0.20
2.33	3.55	0.15
2.66	3.70	0.15
3.00	3.85	0.15
3.33	4.00	0.15
3.66	4.10	0.10
4.00	4.20	0.10
4.33	4.30	0.10
4.66	4.40	0.10
5.00	4.48	0.08
5.33	4.55	0.07
5.66	4.63	0.08
6.00	4.70	0.07
6.33	4.76	0.06
6.66	4.82	0.06
7.00	4.88	0.06
7.33	4.94	0.06
7.66	5.00	0.06
8.00	5.06	0.06
8.33	5.12	0.06
8.66	5.18	0.06
9.00	5.25	0.07
9.33	5.30	0.05
9.66	5.35	0.05
10.00	5.40	0.05
10.33	5.44	0.04
10.66	5.48	0.04
11.00	5.52	0.04
11.33	5.56	0.04
11.66	5.60	0.04
12.00	5.65	0.05

TIME	TOTAL RAINFALL	INCREMENTAL
12.33	5.69	0.04
12.66	5.73	0.04
13.00	5.77	0.04
13.33	5.81	0.04
13.66	5.85	0.04
14.00	5.89	0.04
14.33	5.93	0.04
14.66	5.97	0.04
15.00	6.00	0.03
15.33	6.03	0.03
15.66	6.06	0.03
16.00	6.09	0.03
16.33	6.12	0.03
16.66	6.15	0.03
17.00	6.18	0.03
17.33	6.21	0.03
17.66	6.24	0.03
18.00	6.27	0.03
18.33	6.30	0.03
18.66	6.33	0.03
19.00	6.36	0.03
19.33	6.39	0.03
19.66	6.42	0.03
20.00	6.45	0.03
20.33	6.48	0.03
20.66	6.51	0.03
21.00	6.54	0.03
21.33	6.57	0.03
21.66	6.60	0.03
22.00	6.63	0.03
22.33	6.66	0.03
22.66	6.69	0.03
23.00	6.72	0.03
23.33	6.75	0.03
23.66	6.78	0.03
24.00	6.81	0.03

THESE VALUES WILL BE INPUTTED IN REVERSE ORDER TO ATTEMPT TO MATCH THE PEAK FROM THE FOLLOWING REGRESSION EQUATIONS

$$\text{LOG}(Q_m) = C_m + 0.87 \log(A) \quad *$$

where: C_m = a map coefficient for mean log of annual peaks

Q_m = geometric mean of annual flood peaks, cfs

A = drainage area, mi^2

* FROM - REGIONAL FREQUENCY STUDY, UPPER DELAWARE NEW YORK DIST 1974

SUBJECT DAM SAFETY INSPECTION

COMPUTATIONS BRUNSON'S POND SHEET 4 OF ____ SHEETS

COMPUTED BY JPB CHECKED BY ____ DATE 12-12-80

$\therefore Log(Q_m) = C_m + 0.87 \log(A)$ and $A = 2.38$

FROM FIGURE 2 $C_m = 1.79$

$\therefore Log(Q_m) = 1.79 + 0.87 \log(2.38)$

$\log(Q_m) = 2.1176$

now, compute the standard deviation

$S = C_S - 0.05 \log(A)$

where S = standard deviation

C_S = a map coefficient for standard deviation

$\therefore$ FROM FIGURE 3 $C_S = 0.354$

$S = 0.354 - 0.05 \log(2.38)$

$S = 0.3352$

now, compute the 100 YEAR FLOOD PEAK FROM THE FOLLOWING:

$Log(Q_{pi}) = \log(Q_m) + K(P,g)\,S$

where:

$\log(Q_{pi})$ = log of the annual flood peaks exceeds for a given exceedence frequency

$\log(Q_m)$ = mean logarithm of annual flood peak

$K(P,g)$ = standard deviate for a given EXCEEDANCE FREQUENCY (P) and SKEW COEFFICIENT (g)

S = STANDARD DEVIATION, Logs of ANNUAL PEAKS

$\therefore$ we need to have SKEW COEFFICIENT, FROM FIGURE 5

$g = 0.31$ $\therefore$ interpolated value from chart.

$Log(Q_{(Pi)}) = Log(Q_m) + K(P,g)\,S$

* $K(P,g) = 2.557$

*FROM EXHIBIT 39 - STATISTICAL METHODS IN HYDROLOGY LEO R. BEARD JAN 1962

SUBJECT DAM SAFETY INSPECTION

COMPUTATIONS BRONSON'S POND SHEET 10 OF 10 SHEETS

COMPUTED BY JPB CHECKED BY DATE 12-12-80

$$\text{Log}(Q_{(0)}) = \text{Log}(Q_m) + K(P,g)\,S$$

$$\text{Log}(Q_{100}) = 2.1176 + (2557)(.3352)$$ event per 100 years

$$\text{Log}(Q_{100}) = 2.97471$$

$Q_{100} = 943$ CFS CALL IT $\approx$ 950 CFS

∴ 100 year flood peak is $Q_{100} \approx 950$ CFS

NOW ADJUST RAINFALL IN HECIB PROGRAM WITH LOSS RATES TO APPROXIMATE PEAK OF 950CFS, TO WITHIN 10%.

PEAK INFLOW IN HECI PROGRAM IS 1030 CFS

AND IS WITHIN 10% ✓ OK

NADB FORM 1232, 28 MAR 74

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(NOTICE TO HECIDB USERS

 UJF    ... HECIDB UPDATE TO THE DAMBREAK ROUTINE.
 THI  .OUTINE NOW UTILIZES A
 BREACH WIDTH WHICH IS EQUAL TO
 ZERO UPON INITIATION OF FAILURE
 AND GROWS TO A VALUE EQUAL
 TO BRWID AT THE END OF THE
 FAILURE PERIOD

 FOR TECHNICAL ASSISTANCE CONTACT
 ARLEN FELDMAN, JOHN PETERS, OR PAUL ELY
 AT THE HYDROLOGIC ENGINEERING CENTER
 916-440-2329 (FTS 448-2329)
1**************************
 FLOOD HYDROGRAPH PACKAGE ( HEC-1)
 DAM SAFETY VERSION      JU    1978
   LAST MODIFICATION  01     80
 *************************    *****
     1                A1       BRONSONS POND   DER NO. 90-64-42     WILL USE DATA TO GET PMF
     2                A2   DAM SAFTEY INSPECTION PROGRAM      12-11-80
     3                A3    OVERTOPPING ANALYSIS     ***  PRELIMINARY    ***
     4                B    144       0      20        0        0        0        0        0        0        0
     5                B1     3       0       0        0        0        0        0        0        0        0
     6                K      0       1       0        0        0        0        1        0        0        0
     7                K1   RUNOFF FROM DRAINAGE AREA ABOVE BRONSONS POND
     8                M      0       1    2.38        0     2.38        0        0        0        1        0
     9                O     72    6.69
    10                O1  0.02    0.02    0.02     0.02     0.02     0.02     0.02     0.02     0.02     0.02
    11                O1  0.02    0.02    0.03     0.03     0.03     0.03     0.03     0.03     0.03     0.03
    12                O1  0.03    0.03    0.03     0.03     0.03     0.03     0.03     0.03     0.04     0.04
    13                O1  0.04    0.04    0.04     0.04     0.04     0.04     0.04     0.04     0.04     0.05
    14                O1  0.04    0.04    0.05     0.05     0.05     0.05     0.06     0.06     0.06     0.07
    15                O1  0.06    0.06    0.06     0.06     0.07     0.07     0.08     0.08     0.10     0.10
    16                O1  0.10    0.10    0.15     0.15     0.15     0.15     0.20     0.25     0.35     0.40
    17                O1  0.60    1.60
    18                T      0       0       0        0        0        0      1.5     0.27        0        0
    19                W   1.85    0.45
    20                X   -1.5   -0.05       2
    21                K      1       1       0        0        0        0        1        0        0        0
    22                K1   ROUTING ZPMF'S THRU BRONSONS POND
    23                Y      0       0       0        1        1        0        0        0        0        0
    24                Y1     1       0       0        0        0        0    -1403        1        0        0
    25                Y41403.1  1403.2  1403.6   1404.0   1405.0   1410.0   1415.0   1420.0
    26                Y5     0     0.5    23.0     95.0    520.0   5310.0 13300.0 23500.0
    27                $S     0     380     385      500      890     1490     2320
    28                $E1382.0  1403.0  1403.1   1405.0   1410.0   1415.0   1420.0
    29                $$1403.0
    30                $D1403.1
    31                K     99
1                          PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                RUNOFF HYDROGRAPH AT          1
                                ROUTE HYDROGRAPH TO           1
                                END OF NETWORK


1**********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978


   LAST MODIFICATION  01 APR 80
 **********************************
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D-14

BRONSON POND DAM

OVERTOPPING ANALYSIS

BRONSONS POND DFR NO. 80-64-42 WILL USE DATA TO GET PMF
DAM SAFTEY INSPECTION PROGRAM 12-11-80
OVERTOPPING ANALYSIS *** PRELIMINARY ***

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
144	0	20	0	0	0	0	0	0	0

JOPER	NWT	LROPT	TRACE
3	0	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

RUNOFF FROM DRAINAGE AREA ABOVE BRONSONS POND

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	1	2.30	0.00	2.38	0.00	0.000	0	1	0

PRECIP DATA

NP	STORM	DAJ	DAK
72	6.69	0.00	0.00

PRECIP PATTERN

.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
.02	.02	.03	.03	.03	.03	.03	.03	.03	.03
.03	.03	.03	.03	.03	.03	.03	.03	.04	.04
.04	.04	.04	.04	.04	.04	.04	.04	.04	.05
.04	.04	.05	.05	.05	.05	.06	.06	.06	.07
.06	.06	.06	.06	.07	.07	.08	.08	.10	.10
.10	.10	.15	.15	.15	.15	.20	.25	.35	.40
.60	1.60								

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.50	.27	0.00	0.00

UNIT HYDROGRAPH DATA
TP= 1.85 CP= .45 NTA= 0

RECESSION DATA
STRTQ= 1.50 QRCSN= -.05 RTIOR= 2.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 5.85 AND R= 8.91 INTERVALS

UNIT HYDROGRAPH 51 END-OF-PERIOD ORDINATES, LAG= 1.86 HOURS, CP= .45 VOL= 1.00

24.	91.	184.	278.	347.	372.	352.	314.	281.	251.
224.	200.	179.	160.	143.	128.	114.	102.	91.	82.
73.	65.	58.	52.	47.	42.	37.	33.	30.	27.
24.	21.	19.	17.	15.	14.	12.	11.	10.	9.
8.	7.	6.	6.	5.	4.	4.	4.	3.	3.
3.									

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
0													

A-15

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTING XPMF'S THRU BRONSONS POND

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1403.	1

STAGE	1403.10	1403.20	1403.60	1404.00	1405.00	1410.00	1415.00	1420.00
FLOW	0.00	.50	23.00	95.00	520.00	5310.00	13300.00	23500.00

CAPACITY=	0.	380.	385.	500.	890.	1490.	2320.
ELEVATION=	1382.	1403.	1403.	1405.	1410.	1415.	1420.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1403.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1403.1	0.0	0.0	0.

C-16

BRONSON POND DAM

OVERTOPPING ANALYSIS

page 3/4

********** ********** ********** ********** **********

1

RUNOFF SUMMARY, AVERAGE FLOW IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES(SQUARE KILOMETERS)

		PEAK	6-HOUR	24 HOUR	72 HOUR	AREA
HYDROGRAPH A1	1	1030.	628.	204.	103.	2.38
	(	29.17)(	17.80)(	5.77)(	2.91)(	6.16)
ROUTED TO	1	717.	522.	190.	95.	2.38
	(	20.30)(	14.79)(	5.37)(	2.69)(	6.16)

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1403.00	1403.00	1403.10
STORAGE	300.	300.	385.
OUTFLOW	0.	0.	0.

RATIO OF 100 YEAR FLOOD	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1405.21	2.11	516.	717.	26.00	26.67	0.00

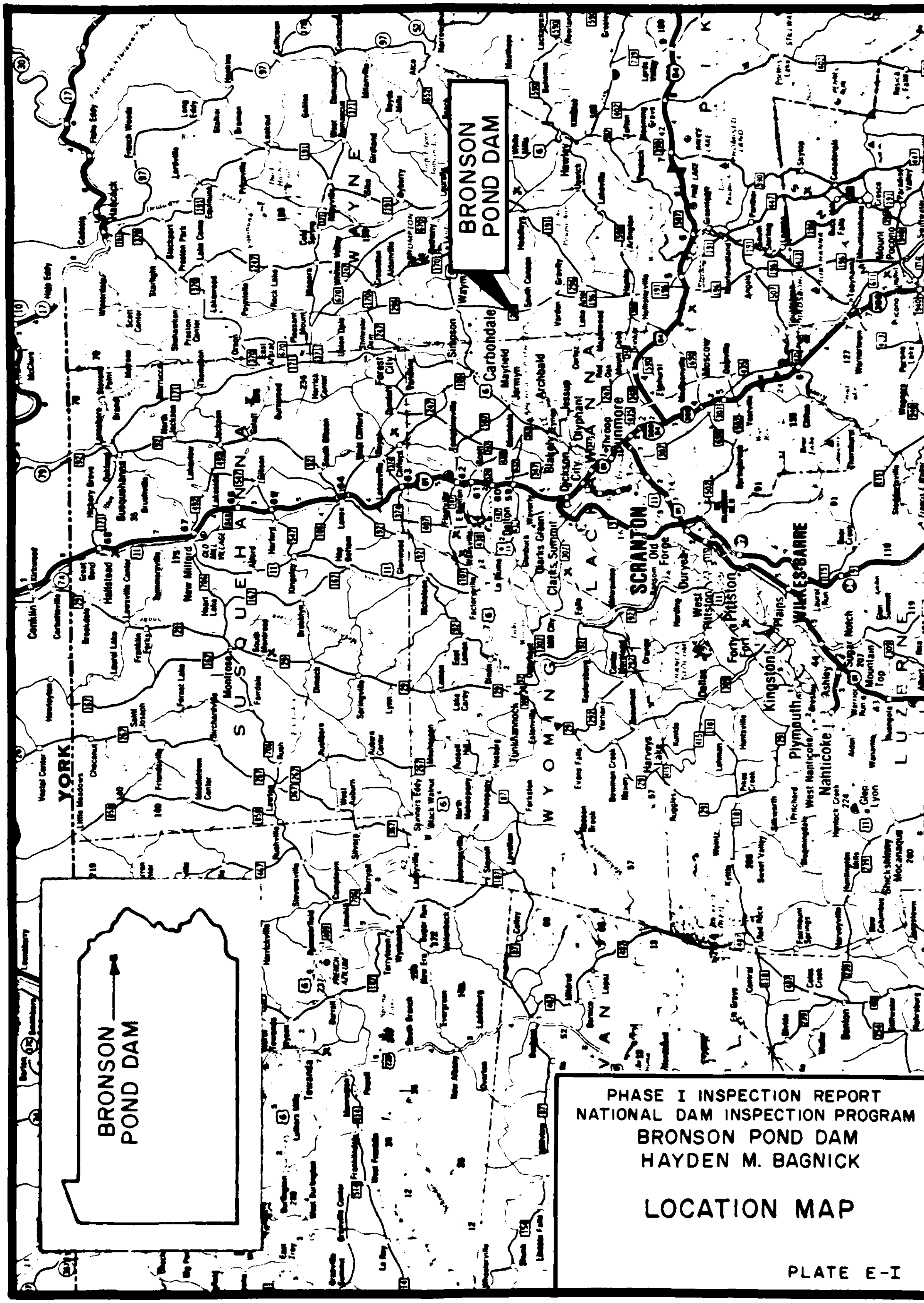
1**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 01 APR 80
****

L1-6

BRANSON ROAD DAM
OVERTOPPING ANALYSIS

APPENDIX E

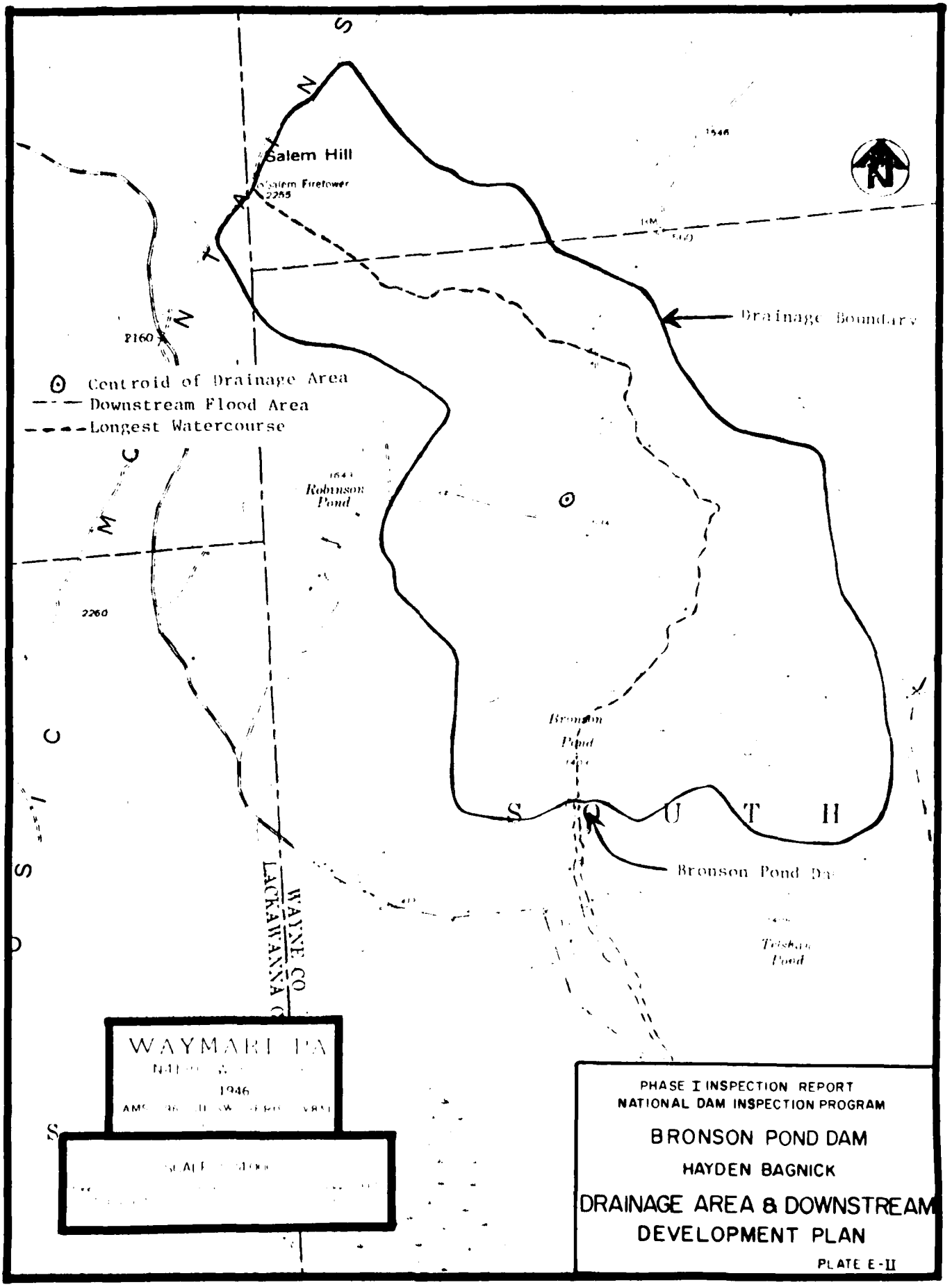
PLATES



PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
BRONSON POND DAM
HAYDEN M. BAGNICK

LOCATION MAP

PLATE E-I


Salem Hill
Salem Firetower
2285
2160
Drainage Boundary
Centroid of Drainage Area
Downstream Flood Area
Longest Watercourse
Robinson Pond
2260
Bronson Pond
Bronson Pond Dam
WAYNE CO
LACKAWANNA
WAYMART PA
1946
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
BRONSON POND DAM
HAYDEN BAGNICK
DRAINAGE AREA & DOWNSTREAM DEVELOPMENT PLAN
PLATE E-II

APPENDIX F

GEOLOGY

BRONSON POND DAM

GENERAL GEOLOGY

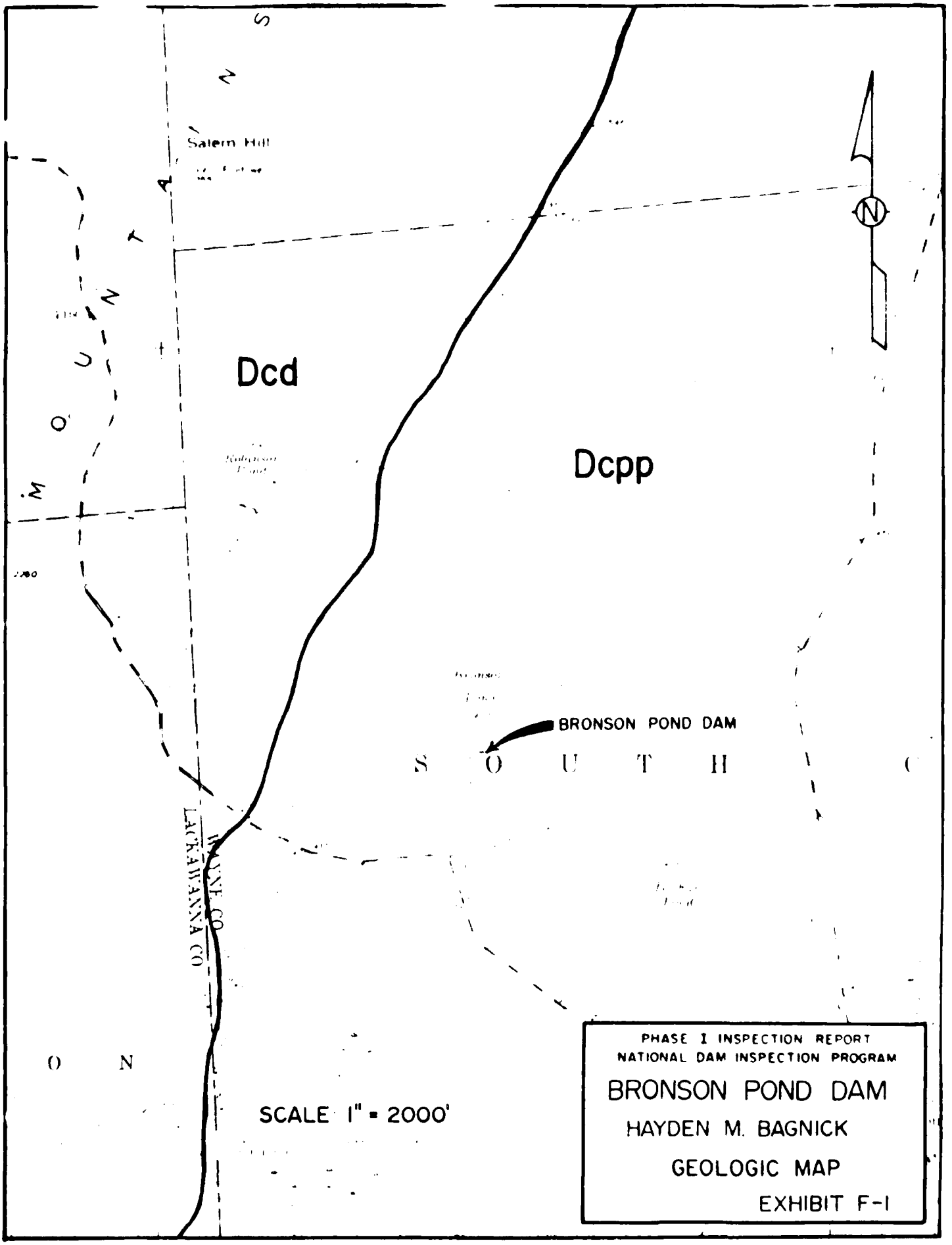
Bedrock at Bronson Pond Dam is the Poplar Gap member of the Catskill Formation. It is medium-gray and light-olive-gray, fine- to coarse-grained sandstone and conglomerate with interbedded pale-red and grayish-red siltstone and shale. The rock is well bedded with sandstone and conglomerate thickly to very thickly bedded; shale and siltstone beds are medium to thick. Joints and cleavage are well developed in thick bedded rocks and are widely spaced; cleavage fractures are closely spaced. Fractures are open in surface exposures. Rock exposures are resistant to weathering. Fragments of sandstone and conglomerate are blocky and slabby, siltstone and shale fragments are platy, chippy and hackly.

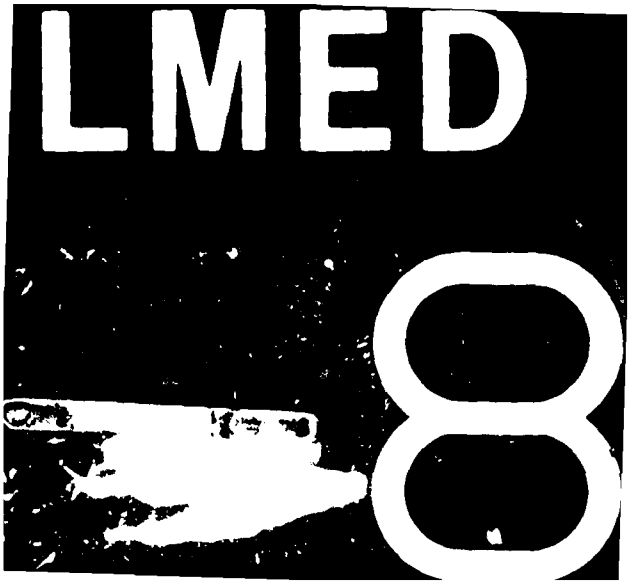
Unconsolidated material overlying the bedrock surface may be thick. Water well drill records showing 48 feet of glacial till in a domestic well near Lake Quinn. The unconsolidated material is sand and gravel with minor amounts of clay.

Legend
(Bedrock)

Dcd CATSKILL FORMATION DUNCANNON MEMBER - Grayish-red sandstone, siltstone, and claystone in fining-upward cycles; conglomerate occurs at the base of some cycles.

Dcpp CATSKILL FORMATION, PACKERTON MEMBER THROUGH POPLAR GAP - Fine to medium-grained gray sandstones, well-indurated to quartzite; sandstones grade upward into grayish-red siltstones and shales.


Salem Hill
Dcd
Dcpp
BRONSON POND DAM
SOUTH
LACKAWANNA CO.
WAYNE CO.
SCALE 1" = 2000'
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
BRONSON POND DAM
HAYDEN M. BAGNICK
GEOLOGIC MAP
EXHIBIT F-1


LMED
8